

Innovation Management

Summary

Basic approach

The Daigas Group views technology as the foundation for its corporate competitiveness and views research and development as one of its most important strategies for differentiating itself from the competition. We also recognize that proactively leveraging digital technology for our business, creating innovative services, evolving data management, and reforming business processes will lead to improved business competitiveness.

While providing a stable supply of city gas in the Kansai region, the Group has expanded its business into peripheral areas and developed together with the region by working on research, development, and practical application of various new technologies that lead to comfortable lives and development of business for our customers.

To attain sustainable development and growth that address the needs of the environment and society, the Group will create new value and provide a wider range of services and new technologies to customers in collaboration with various stakeholders.

| Theme | Items to be addressed | Specific initiatives |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Promoting business transformation with DX</p> <p>→ p.065</p> | <ul style="list-style-type: none"> • New service development • Operational process innovation • DX promotion structure enhancement | <p>Policy and promotion system</p> <p>We aim to become a “corporate group capable of keeping on changing” to continue providing value amid rapid change in society and the working environment as well as changes in customer values. We will proactively leverage digital technology, which is progressing rapidly, for our business and accelerate both value provision through new service creation and productivity improvement through operational process innovation.</p> <p>In April 2022, we established the DX Strategy Department at the Corporate Planning Headquarters, and the DX Committee, a corporate committee, performs cross-organizational coordination and promotion of DX for the entire Daigas Group.</p> <p>In FY2024.3, we commenced specific initiatives, including Daigas X (Daigas Transformation), which reforms how to execute work, as well as an initiative to innovate both customer experience and operational processes in a joint team of business and digital talent.</p> <p>Initiatives undertaken in FY2024.3</p> <ul style="list-style-type: none"> • Created new customer experience • Transformed employee value through Daigas X (Daigas Transformation) • Worked on operational innovation by adopting SaaS and generative AI • Developed DX core staff (cumulative total of approx. 180 people) |
| <p>Research and development/intellectual property</p> <p>→ p.068</p> | <ul style="list-style-type: none"> • Research and development of technologies that contribute to achieving carbon neutrality • Technology development to ensure stable energy supply and safety • Research and development for the creation of new businesses • Securing and utilizing intellectual property rights | <p>Policy and promotion system</p> <p>In line with the Carbon Neutral Vision, Energy Transition 2030, and the Medium-Term Management Plan 2026, we aim to realize a carbon neutral society and promote research and development of technologies to ensure a stable energy supply and safety as well as to create new businesses. Based on the rules and regulations related to technological development, we make decisions on the implementation of technological development, allocate appropriate budgets according to the importance of the theme, and follow up on progress at the time of implementation.</p> <p>Initiatives undertaken in FY2024.3</p> <ul style="list-style-type: none"> • Promoted research and development, including that of methanation, to achieve carbon neutrality • Continued to promote technological development to ensure and improve safety, and research and development to create new businesses • Secured and utilized intellectual property rights in conjunction with business and technology development strategies • Promoted the commercialization of natural material-derived ketone body OKETOA™ by utilizing it for health foods, etc. • Promoted the commercialization of antimicrobial and antivirus agent TioClean™ |
| <p>Creating new businesses</p> <p>→ p.069</p> | <ul style="list-style-type: none"> • Commercialization of the Daigas Group's proprietary technologies • Development of new businesses through cooperation with diverse partners | <p>Policy and promotion system</p> <p>We will commercialize the Daigas Group's proprietary technologies and seek to create new businesses by combining our strengths with other companies' technologies and services. We thus aim to increase the Group's earnings, and contribute to resolving social issues.</p> <p>From FY2025.3, functions to create new businesses are consolidated under the umbrella of the Next-Generation Business HQ. With this structure, we will seamlessly promote research and technology development, cooperation with diverse partners, and commercialization, and accelerate the creation of new businesses.</p> <p>Initiatives undertaken in FY2024.3</p> <ul style="list-style-type: none"> • Promoted open innovation activities that actively integrate and utilize Osaka Gas's technologies and needs and external parties' technologies and ideas • Promoted the commercialization of radioactive cooling material SPACECOOL® • Created new businesses, such as those related to EVs and circular economy, with partners |

Promoting Business Transformation with DX

Principle and Outline

We aim to become a “corporate group capable of keeping on changing” to continue providing value amid rapid change in society and the working environment as well as changes in customer values. We will proactively leverage digital technology, which is progressing rapidly, for our business and accelerate innovative service creation, data management evolution, and operational process innovation.

We will change our business operations to enable them to respond rapidly and flexibly to any changes to enhance productivity dramatically to create value sustainably for realizing Medium-Term Management Plan 2026 and Long-Term Management Vision 2030.

In the new age in which both our customers and services rapidly change, we will aim for transformation of the business itself and for innovation as a corporate group that can keep on changing by revising constantly and flexibly our business model, operations, rules, and systems, which used to be taken for granted.

To make a major transformation to realize our vision, we will work on building a promotion system driven by top management, strengthening human resources development, demonstrating the comprehensive strength of the Daigas Group, including OGIS-RI Co.,Ltd., and building alliances with our partner companies.

DX Promotion System

In April 2022, to realize “what we aim to be” and accelerate business transformation (creation of new businesses/sophistication of existing businesses/operational process innovation) and system transformation, we established the DX Strategy Department under the Corporate Planning Headquarters as an organization consolidating the Information/Communication Systems Department and the DX Promotion Office.

We also established the DX Committee as a company-wide committee to perform cross-organizational coordination and promotion of DX (business transformation utilizing digital technology) for the entire Daigas Group from the perspective of alignment with the business, IT and financial strategies, etc., and we aim to realize the group-wide vision and transform the business.

DX Strategy

1 New Service Development

We will offer various services with higher value by incorporating trends and the diverse needs of customers without delay. Services here do not only refer to the new businesses, but also encompass the enhancement of existing businesses that lead to an increase in the number of customer accounts, business opportunities, sales, etc.

To this end, utilizing valuable assets such as data becomes increasingly important. For example, we will make use of customer data and provide 1-to-1 communication that proposes optimal services at optimal timings for customers. In addition, we will accelerate the trial and error cycle and foster Group-wide customs and mindsets that enable the Group to move forward with new initiatives aggressively and quickly.

2 Operational Process Reform

We will also focus on merging and abolishing operations as well as standardizing and aggregating different procedural operations among organizations to broadly redesign the entire operational process.

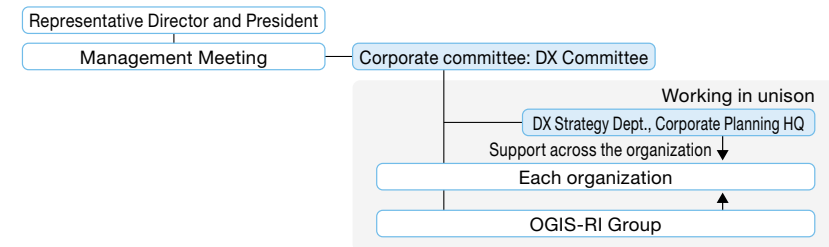
In addition, we will improve operational efficiency by incorporating SaaS*2, generative AI, and other digital technologies into business operations. Simultaneously, we will reform ways of work and how to proceed with tasks through Daigas X. This will make room for deepening highly specialized operations and lead to better value provision to customers.

*2 SaaS: A service that allows users to use software via a network, such as the internet

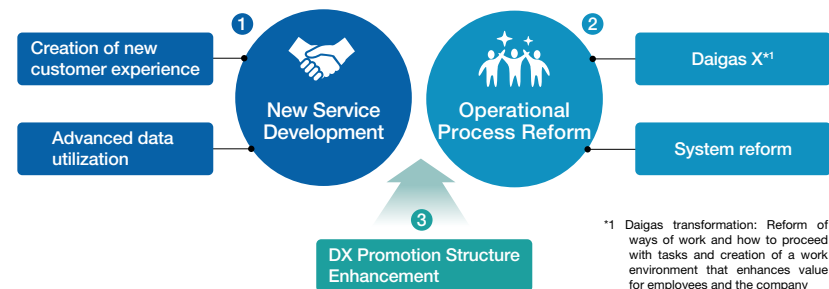
3 DX Promotion Structure Enhancement

We established group-wide systems and structures to promote DX, with stronger collaboration with OGIS-RI Co., Ltd. in charge of the IT solution business. In addition, The Group will accelerate DX by demonstrating its collective strength and strengthening its human resources and structures through the development of core personnel who will be responsible for promotion and business transformation.

DX Promotion System



What We Aim To Be “A Corporate Group Capable of Keeping on Changing” Daigas Group’s DX Strategy



*1 Daigas transformation: Reform of ways of work and how to proceed with tasks and creation of a work environment that enhances value for employees and the company

Key Initiatives

The Daigas Group is driving forward initiatives in line with its DX strategy. In order to promote employee understanding, the progress, results, etc. of specific initiatives are communicated through the internal portal website.

1 New Service Development

Creation of new customer experience

To keep providing value to customers, we have started to transform our business activities toward what we aim to be in 2030. A project has been launched involving approximately 70 employees from residential business divisions*1, which perform customer-facing activities; the DX Strategy Dept., which promotes DX; and OGIS-RI Co., Ltd. The project is restructuring our business operations and systems that support those operations, taking a customer-oriented approach. We are trying out new ways of working that incorporate Agile "Forms"*2 in proceeding with tasks, which allows us to adapt quickly to changes in the circumstances.

We will continue with these initiatives, and define what we aim to be and promote transformation in businesses other than residential as well.

*1 Please see our Integrated report 2024, P.40-P.41 examples of FY2024.3 activities in services for residential customers

*2 An agile approach is a method where minimally required output is generated during short cycles and improvements are made based on feedback

2 Operational Process Reform

Transforming employee experience through Daigas X (Daigas transformation)

Daigas X, in full-scale operation since FY2024.3, rolls out activities that aim to enable diverse human resources to take on challenges, keep learning, and grow, as well as to let us speedily explore and deepen our understanding of unprecedented changes. Discussions were also held in each organization on where they aim to be and what actions to take, in light of the situation of each organization and on the frontline. A total of 4,400 employees participated in the discussions. Information was shared on initiatives that are producing results, such as the utilization of IT tools to accumulate knowledge across organizational boundaries. From FY2025.3 onward, we will continue with the discussions in each organization, identify issues, and advance transformation.



Aims of "Daigas X" are communicated and shared within the Group

System reform

In FY2024.3, we introduced SaaS in such operations as sales, accounting, and internal communications, promoting operational reforms. We offered an environment where employees can try using generative AI, with information security guaranteed. More than 700 employees used it, and we confirmed that efficiency improved in such tasks as summarizing documents and drafting answers to inquiries. Going forward, we plan to expand the scope of use while paying attention to the accuracy of information, security, and other issues.

In FY2025.3, we will introduce an environment where all employees can use generative AI, accelerating new value creation and operational reform even further.

3 DX Promotion Structure Enhancement

Promotion structure that aims to integrate business with digital

In FY2024.3, a new training program for managers was launched to improve their skills and transform their mindset. This adds to the lectures by and dialogues with external experts in place for the management since the previous year. We also enhanced the development of DX core staff, who play a core role in DX promotion. By implementing a development program that includes lectures, OJT, and feedback interviews and taking other measures, we have developed a total of approximately 180 DX core staff members as of April 2024. In addition, we offered a self-learning support program on DX for all employees, and approximately 700 employees took the program.

Furthermore, OGIS-RI Co., Ltd. offers DX Practical Training, which is a service where IT professionals work together with organizations to help resolve issues. More than 100 cases a year were submitted for consultation. There was a case where using IT tools in answering inquiries halved the hours spent on the task. The training also functions as an opportunity to gain experience on DX while implementing the transformation. With these initiatives, we aim to build a system where top-down and bottom-up approaches create synergy.

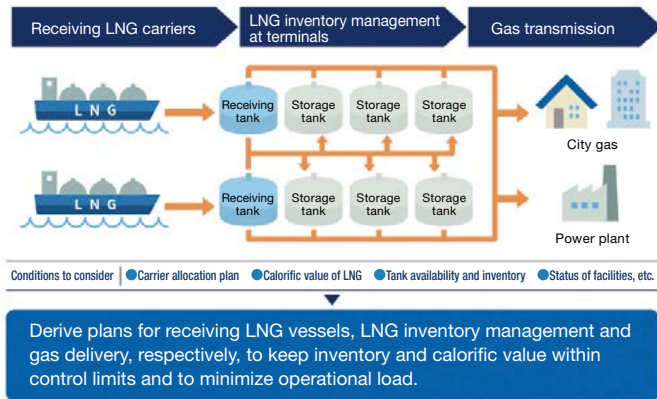
Development Program by Job Level

| Job level | Development program |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Management | <ul style="list-style-type: none"> Lectures by and dialogues with external experts held about once a month (approx. 20 participants) |
| Managers | <ul style="list-style-type: none"> Rollout of videos and textbooks to gain basic knowledge, group training for part of managers |
| DX core staff | <ul style="list-style-type: none"> Development program including lectures, OJT, and interviews (developed a total of approx. 180 employees) |
| All employees | <ul style="list-style-type: none"> E-learning, courses for obtaining qualifications Share lectures for the management Offer a self-learning support program that mainly consists of online learning |

Key Initiatives

DX in Gas Production Process—Optimization of LNG Tank Operation Planning

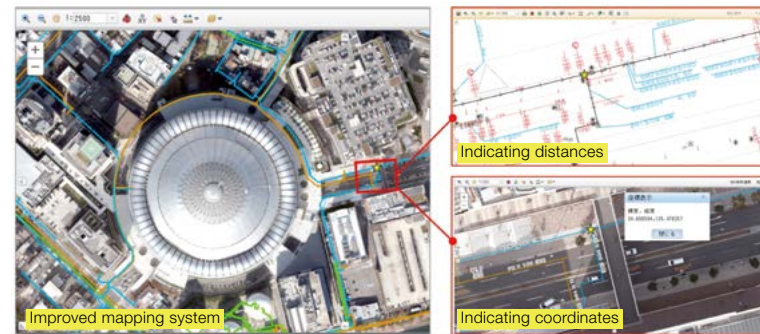
Once LNG is delivered to a manufacturing plant, it is stored in tanks and then delivered according to demand, which requires appropriate heating value management and inventory control. The formulation of the tank operation plan requires expertise of skilled personnel since complex equipment configurations, operational constraints, city gas demand and various other factors need to be considered. We are working to optimize tank operation planning, using this expertise and mathematical programming.



Digital Utilization in Gas Supply Equipment Management

Since the gas supply business involves a great deal of on-site work, including gas pipe installation, maintenance and management, and safety monitoring, and involves an extremely large number of employees and partner companies, we are promoting the use of digital technology for the purpose of future efficient business operation, improvement of safety quality, and securing of technology and expertise.

We are operating a mapping system that displays and manages information on gas supply equipment on a map, including the location of approximately 60,000 km of gas pipes and the history of past gas works and works accepted from other companies, and using this information as the basis for various operations related to gas supply. By managing absolute coordinates based on latitude and longitude coordinates, we increased the accuracy of information on the location of gas pipes, which was previously handled based on relative distances to buildings and other structures.



AI-Based Self-Wheeling Scheme for Renewable Electricity —Starting supply and demand management service for self-wheeling, using a solar power generation system—

As one of our carbon neutralization solutions for corporate customers, we have started proposing a new electricity scheme using renewable energy, which is greatly affected by weather conditions, by using the weather forecasting technology and AI developed independently by Osaka Gas for output and demand prediction to improve accuracy.



Research and Development/Intellectual Property

Principle and Outline

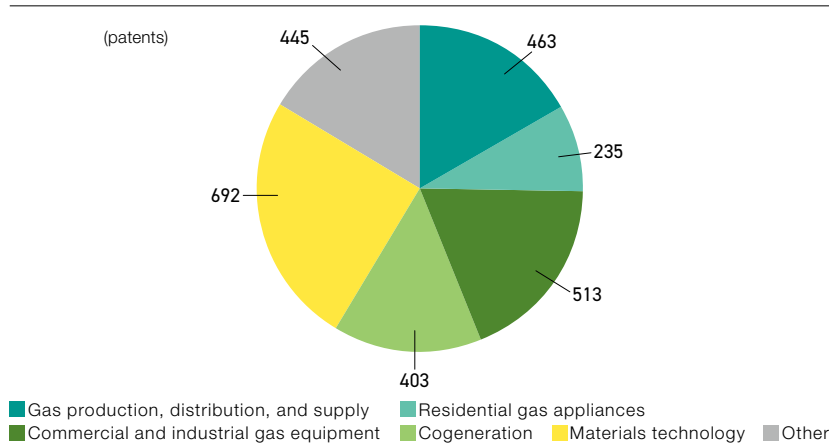
The Daigas Group consider research and development to be one of the most important growth strategies for the Group. In addition to ensuring and improving safety, we are conducting research and development aimed at improving operational efficiency and reducing equipment-related costs through the use of digital technology, improving customer convenience, and enhancing the sophistication of existing services. We are also engaged in research and development for the creation of new businesses and research and development that contributes to the realization of carbon neutrality.

Furthermore, we regard intellectual property rights as an important management resource and are actively working to secure and utilize the rights in conjunction with our business and technology development strategies. We are also actively promoting open innovation activities to accelerate and streamline development and create new technologies and products by actively integrating the Group's proprietary technologies with those of external parties and utilizing them.

■ Patent Portfolio by Business Type (Group)

Fiscal year ended March 31, 2024

2,751 patents



Reward System for Inventors

Osaka Gas has an invention achievement reward system in which inventors who have made significant contributions to its business are rewarded in order to motivate employees to invent and encourage intellectual property activities.

We disclose the results of the review of achievement rewards on the internal portal site, and respond to inquiries and opinions from employees regarding the results of the review, in an effort to operate the system in a fair and transparent manner.

Initiatives for Commercialization

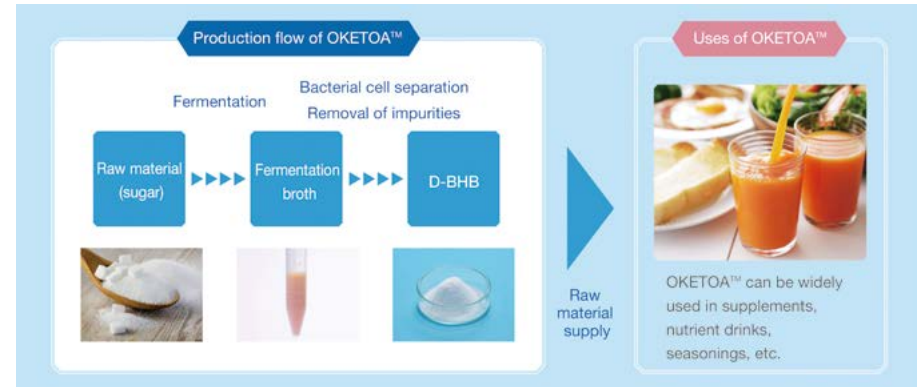
Promoting the commercialization of natural material-derived ketone body OKETOA™ by utilizing it for health foods, etc.

Taking advantage of its proprietary fermentation technology cultivated through biogas manufacturing and development and other businesses, Osaka Gas succeeded in mass-producing ketone body D-β-hydroxybutyric acid (D-BHB) by fermentation for the first time in the world. We worked on the manufacturing and achieved the commercialization of natural material-derived ketone body OKETOA™.

Ketone bodies are produced in the body as an energy source when sugar, utilized as an energy source in the body, becomes depleted (when carbohydrate intake is restricted).

Recently, D-BHB has been shown to be an energy source that elicits various physiological effects superior to sugar and is attracting attention around the world as a raw material for supplements, etc. We are promoting the use of D-BHB for a wide range of products, including cosmetic raw materials, health foods, and supplements.

■ Production flow of natural material-derived ketone body OKETOA™



Promoting the commercialization of antimicrobial and antivirus agent TioClean™

Osaka Gas started the development of antimicrobial and antivirus agents before the spread of COVID-19. By introducing additives to our proprietary photocatalysts that take advantage of technology developed for solar power generation, we have succeeded in the development of antimicrobial and antivirus agent TioClean™, which demonstrate high antimicrobial, antivirus and antifungal properties and are easy to use.

There is a strong demand for antimicrobial and antivirus agents that are transparent, well adhere to the base material, and demonstrate antimicrobial and antivirus properties in a wide range of environments. TioClean™ offers all of these properties.

We will roll it out to be used for furniture and other home equipment and public, commercial, and other facilities, where there is demand for antimicrobial and antivirus properties, as well as for medical equipment and hygiene products.

New Businesses Creation

Principle and Outline

The Daigas Group has expanded its business domains to the Urban Development Business, Materials Solutions Business, and Information Solutions Business by taking advantage of technologies and strengths nurtured in the energy business and creating products and services that help resolve issues customers are facing. We will continue to work on the creation of new businesses, aiming to facilitate the Group’s sustainable growth and contribute to the resolution of social issues.

Open Innovation Activities



Open innovation refers to an efficient approach used to seek solutions outside the company to the problems that Osaka Gas is unable to solve independently, with the aim of creating new value. Osaka Gas has pioneered this approach since 2009. Our efforts have led to the building and expansion of a network of partnerships (Open Innovation Platform) with universities, public research institutes, small enterprises, large corporations, ventures and overseas companies.

To find outside partners to work with, we have revealed details of our technology to-do list, something we have rarely done in the past, in order to solicit promising technical ideas from outside parties. After we launched full-fledged open innovation activities in FY2010.3, we have achieved many matchmaking opportunities. Some cases have actually led to commercialization and practical applications.

For example, gas pipe patrols using technology that automatically recognizes the part requiring construction with an on-board AI camera, and the use of drone technology in facility inspections are examples of value-added products created by combining our technology with external technologies.

The task ahead is to introduce some of the efficient technologies that we obtained externally, and together with our alliance partners, actively promote the creation of new R&D themes and creation of new businesses through the Open Innovation Platform.

Developing new EV-related businesses with partners

Expanding the use of EVs along with providing carbon neutral power sources is positioned as an effective means to achieve carbon neutrality by 2050. Against such backdrop, Osaka Gas is driving forward new initiatives, including capital and business alliances in the EV-related field with REXEV Co., Ltd., NExT-e Solutions Inc., folofly Inc., and Terra Motors Corporation.

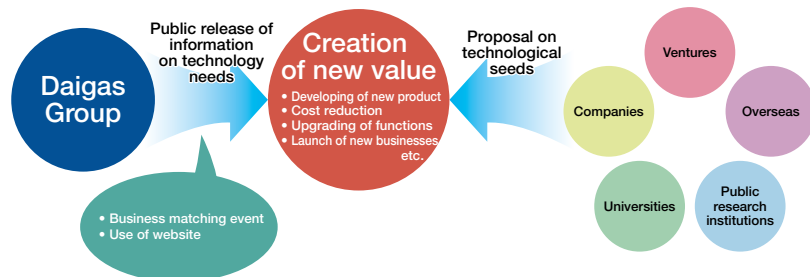
Specifically, we are considering business in a variety of fields through the alliance with these companies, such as utilizing EVs for the adjustment of power supply and demand and car sharing, converting mobility-derived reused storage batteries to grid storage batteries*1, utilizing commercial EVs in the car leasing business, and proposing and developing EV charging infrastructure.

In addition, one of our Group companies, Daigas Energy Co., Ltd., launched in November 2023 the D-Charge service, where the company provides EV charging solutions that combine the installation of EV chargers with energy management*2 to commercial and industrial customers without any initial investment.

D-Charge offers both fast and regular chargers and meets the needs for base charging*3 and destination charging*4. In accordance with customer needs, the service can also incorporate D-Green*5, which supplies electricity from 100% renewable energy sources.

*1 Storage batteries directly connected to power grids to stabilize grids by storing electricity when there is excess power in the grid and discharging it when there is a shortage.
 *2 Cutting peak power use and shifting peak power loads to reduce the impact of EV charger use on power demand.
 *3 Charging at the base for the vehicle, such as home or company parking lots.
 *4 Charging at the destination, such as commercial facilities, while staying there.
 *5 Tariff for the supply of electricity from 100% renewable energy sources.

How Open Innovation Works



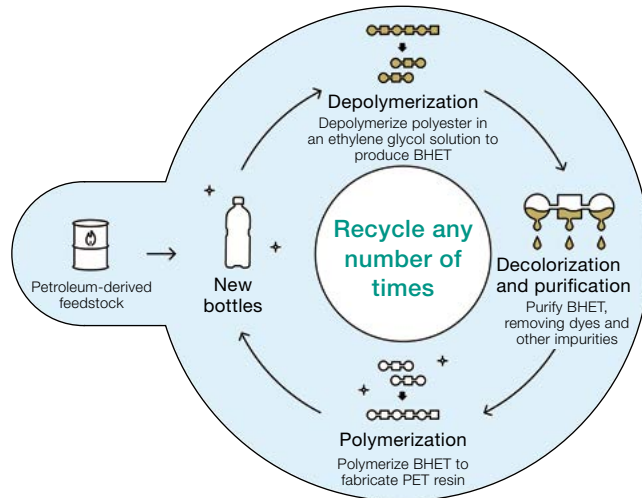
Developing new circular economy-related businesses with a partner

In December 2023, Osaka Gas entered into a capital and business alliance with JEPLAN, INC., which engages in businesses related to technologies for chemically recycling polyethylene terephthalate, a raw material for plastic bottles and other goods.

JEPLAN, INC. is one of the few companies in the world that has commercialized the horizontal recycling of plastic bottles to plastic bottles and polyester clothing to polyester clothing, using its proprietary PET chemical recycling technologies.

The Daigas Group will take advantage of its strong network and work to promote the recycling of plastic bottles and clothing in the Kansai area. The Group will also work on the reduction of costs and CO² emissions in the chemical recycling process with its energy-related solutions. Both companies will take advantage of their respective strengths and aim to contribute to the creation of new value and the promotion of a circular economy.

■ Recycling to make bottles from bottles



Source: "Making bottles from bottles" from JEPLAN, INC.'s website

Launching "FitDish," a regular delivery service for refrigerated pouched foods

Osaka Gas started in September 2023 the regular home delivery (subscription) service "FitDish," using "Automatic Diagnosis" to deliver refrigerated pouch foods tailored to each customer's needs based on inputs on lifestyle and preferences.

With "Automatic Diagnosis," customers enter information on the Web about their family structure, allergies, and other preferences that match their lifestyle, and receive monthly menus which our proprietary algorithm estimates to be highly satisfying according to their needs. Personalization accuracy is further improved by evaluating the food afterwards. It eliminates the "menu-planning fatigue" of having to think about the menu, such as thinking "What should I cook today?" or "What should I cook for one more dish?"

The dishes we deliver are supervised by Osaka Gas Cooking School Co., Ltd. In order for our customers to eat with peace of mind, we use as few preservatives and coloring agents as possible and focus on a gentle, home-cooked taste that they will never get tired of. In addition, we also provide arranged recipes so that customers can enjoy the dishes they receive even more. Moreover, by delivering refrigerated pouch foods that do not need to be thawed, not only does it take less time to cook compared to freezing, but it also eliminates "freezer congestion" where the freezer is full and no more space is available, allowing space-saving storage in the refrigerator. Customers can also store the dishes in the refrigerator for about a month, so they can use them whenever they like.



Delivered once a month in a refrigerated pouch



Can be stored in the refrigerator to save space